CLAIMS

What is claimed is:

5   1.   A system for automating review of capture verification by a medical practitioner, the system being configured for use with an implantable stimulation device implanted in a patient and a programmer operated by the medical practitioner and configured to remotely communicate with the implantable stimulation device, the system

10   comprising:

autocapture means for performing automatic capture verification

through the implantable stimulation device to detect a presence

of a captured cardiac event and an absence of a captured

cardiac event when the captured cardiac event is expected;

15   control means for generating a visual representation of the

presence and absence of the captured cardiac event; and

display means for displaying the visual representation to the

medical practitioner, to permit the medical practitioner to

examine and analyze the performance of the automatic capture

20   verification.

2.   The system of claim 1, further comprising:

first selection means, operatively coupled to the autocapture

means, for selecting one of an atrial and a ventricular chamber

25   of the patient's heart at which the capture verification is

performed.

3.   The system of claim 1, wherein:

the autocapture means comprises a plurality of unique means for

30   automatic capture verification; and

the system further comprises second selection means, operatively

coupled to the autocapture means, for selecting a particular one

of the unique automatic capture verification means for
performing the automatic capture verification.

4.   The system of claim 1, wherein:

the autocapture means further comprises means for detecting a
plurality of additional cardiac events occurring during the
automatic capture verification, and

the control means further comprises means for identifying the
plurality of additional cardiac events in the visual
representation.

5.   The system of claim 4, wherein the plural additional cardiac
events comprise physiological atrial and ventricular events.

6.   The system of claim 1, wherein the control means further
comprises:

means for identifying in the visual representation a plurality of
pacing events occurring during the automatic capture
verification.

7.   The system of claim 6, wherein the plural pacing events
comprise atrial and ventricular pacing pulses.

8.   The system of claim 7, wherein:

each of the plural pacing events comprise amplitude and duration
characteristics; and

the control system further comprises means for recording, in the
visual representation, the amplitude and duration characteristics
for the each pacing event of the plurality of pacing events.

9.	The system of claim 1, wherein the control means further comprises:

means for marking the captured cardiac event in the visual

representation with a visual marker representative of capture;

and

means for marking absence of the captured cardiac event with a

visual marker representative of absence of capture in a location

in the visual representation where the captured cardiac event

was expected to occur.

10.	The system of claim 1, further comprising:

means for automatically assessing a pacing threshold value of the

implantable stimulation device;

means for adding a suitable safety margin to the pacing threshold

value to determine recommended pacing amplitude and pulse

width; and

means for displaying the recommended pacing amplitude and

pulse width.

11.	The system of claim 10, further comprising:

third selection means operable for selectively activating the

autothreshold means from the programmer.

12.	The system of claim 10, wherein:

the control means further comprises means for generating an

additional visual representation of the pacing threshold

assessment; and

the additional visual representation is displayed to the medical

practitioner on the display means, to permit the medical

practitioner to examine and analyze the performance of the

automatic pacing threshold assessment.

13. The system of claim 1, further comprising:

printing means operatively coupled to the control means for
generating a printed copy of the visual representation.

5   14. The system of claim 12, further comprising:

printing means operatively coupled to the control means for
generating a printed copy of the additional visual
representation.

10   15. A system for automating review of capture verification by a
medical practitioner, the system being configured for use with an
implantable stimulation device implanted in a patient and a programmer
operated by the medical practitioner and configured to remotely
communicate with the implantable stimulation device, the system

15 comprising:

autocapture means for performing automatic capture verification
through one of the implantable stimulation device or the
programmer;

detection means for detecting presence and absence of expected

20   cardiac events during the automatic capture verification;

control means for identifying a captured cardiac event when the
captured cardiac event is detected, and for identifying, when an
expected captured event is not detected, an absence of the
expected captured cardiac event;

25   marking means for marking each of the identified captured cardiac
events and the absence of the expected captured cardiac
events with a pre-determined corresponding visual
representation; and

display means for displaying the visual representation to the

30   medical practitioner to permit the medical practitioner to
examine and analyze the performance of the automatic capture
verification.

16. A method for automating review of capture verification by a medical practitioner, the method being implemented in an implantable stimulation device implanted in a patient and a programmer operated by
5   the medical practitioner and configured to remotely communicate with the implantable stimulation device, the method comprising the steps of:

    performing an automatic capture verification through one of the implantable stimulation device or the programmer by adjusting the stimulation device's stimulation pulse energy and by
10   detecting a presence and absence of an expected captures cardiac events;
    generating a visual representation of the automatic capture verification on an output device located in the programmer, the visual representation being configured to identify a presence of
15   the captured cardiac events when the captured cardiac event is detected, and to identify an absence of the expected captured cardiac event when the cardiac event is not detected.

17. The method of claim 16, wherein the step of performing
20   automatic capture verification through one of the implantable stimulation device or the programmer, further comprising the steps of:
    obtaining an intracardiac electrogram through the implantable stimulation device; and
    performing the automatic capture verification using the intracardiac
25   electrogram.

18. The method of claim 16, wherein the step of performing automatic capture verification through one of the implantable stimulation device or the programmer, further comprising the steps of:
30   obtaining an surface electrocardiogram through the programmer; and

performing the automatic capture verification using the surface
electrocardiogram.

19.   The method of claim 16, further comprising the steps of:
recording, in the visual representation, the amplitude and duration
characteristics for each pacing event.

20.   The method of claim 19, further comprising the steps of:
marking the captured cardiac event in the visual representation
    with a visual marker representative of capture; and
marking the absence of the captured cardiac event with a visual
    marker representative of absence of capture in a location in the
    visual representation at which the captured cardiac event was
    expected to occur.

21.   The method of claim 20, further comprising the step of:
automatically assessing a pacing threshold of the implantable
    stimulation device;
determining a recommended pulse amplitude and pulse width
    above the pacing threshold to ensure capture; and
displaying the recommended pulse amplitude and pulse width on
    the programmer.

22.   A method for automating review of capture verification by a
medical practitioner, the method being implemented in an implantable
stimulation device implanted in a patient and a programmer operated by
the medical practitioner and configured to remotely communicate with the
implantable stimulation device, the method comprising the steps of:
    (a) selectively initiating automatic   capture verification by the
        medical practitioner;
    (b) performing automatic capture verification through the
        implantable stimulation device;

(c) detecting, by at least one of the implantable stimulation device and the programmer, presence of cardiac events and absence of expected cardiac events during the automatic capture verification;

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(d) identifying, by at least one of the implantable stimulation device and the programmer, a captured cardiac event when the captured cardiac event is detected, and when an expected capture event is not detected, identifying an absence of the expected captured cardiac event;

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(e) marking, by at least one of the implantable stimulation device and the programmer, at least one of the identified captured cardiac event and the absence of the expected captured cardiac event with a pre-determined corresponding event marker;

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(f) generating, by at least one of the implantable stimulation device and the programmer, a visual representation of the identified cardiac events and the event markers; and

(g) displaying, at the programmer, the visual representation to the medical practitioner to permit the medical practitioner to

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examine and analyze the performance of the automatic capture verification.